



**DESCRIPTIVE NOTES**

**Introduction**  
A knowledge of both the magnitude and frequency of occurrence of low flows in streams and rivers is vital in the planning, management and protection of water resources. Low flow information is used by government agencies, municipalities, and consulting engineers for assessing water availability, allocating water allocations, and designing water supply and waste-assessment projects.

The purpose of this map is to provide specific data on low flows and flow durations for rivers and streams in Northeastern Ontario that flow into Lake Superior, Lake Huron, and the Ottawa River Basin. Analyses are presented for those locations with automatic recorder and for which several years of continuous daily records are available. These analyses have been made using data for the summer fall period, June 1 to November 30. Low flows during this period are generally more critical than those in winter because of greater recreational use made of these streams and increased activity of aquatic life. Low flows during the summer fall period result from meteorological conditions that are different from those during the winter period and are regarded as a distinct statistical condition for analysis.

Where possible, data have been analysed for the 25 year period 1953 to 1977. This period of record has been selected because of the hydrological conditions, in the case of rivers with less than 25 years of record, representative flow-regulation practices. For those stations with less than 25 years of record, the period of record used has been analysed. No attempt has been made to adjust the data for the effects of any regulation included in the selected period, or to adjust all analyses to a common period.

Two standard analyses have been used: low-flow frequency analysis and daily low-flow duration analysis. Curves obtained from these analyses are on file with the Water Resources Branch, Ministry of the Environment.

Use of a low-flow frequency or flow-duration curve for design purposes makes the implicit assumption that future conditions, during the life of the structure for which the design flow is required, are essentially the same as those prevailing during the period of record used for analyses. It is also assumed that the record used is a representative sample of streamflow at the site, this is most likely to be valid if a long record is utilized.

**Flow-Duration Analysis**  
A flow-duration curve is a cumulative frequency curve which shows the percentage of time specified streamflows are equaled or exceeded during a given period of record. The curve shows the flow characteristics of the stream through its range of discharge without regard to the sequence of instantaneous events. The analyses were made with the aid of a digital computer using mean daily flows. From the frequency curve, values were taken at 2%, 5%, 10%, 25%, 50%, 75%, 90%, and 95%. With these flow values and the minimum recorded daily flow, it is possible to reconstruct the curve throughout most of its range.

**Low-Flow Frequency Analysis**  
A low-flow frequency curve is a graph of annual (or seasonal) minimum streamflow versus average probability level or recurrence interval (in years). The analyses were made with the aid of a digital computer considering the annual minimum 7-day flows. From the frequency curves obtained by plotting the streamflow on a semi-logarithmic scale, the commonly used design values were taken (7-day Q<sub>2</sub>, 7-day Q<sub>5</sub>, 7-day Q<sub>10</sub>, and 7-day Q<sub>25</sub>), with extrapolation of the curves as required. For stations with less than 25 years of data, the frequency curves were not extrapolated beyond the 7-day Q<sub>2</sub>.

**Selected References**  
Environment Canada, published annually, Surface water data—Ontario Water Survey, Can. Matrices, N.C. 1983, Probability distribution of low flows, U.S. Geol. Surv., Publ. Paper 424-A.  
Ministry of the Environment, 1979, Low flow characteristics of streams in northeastern Ontario: flow-duration and low-flow frequency curves, Water Res. Br., open file.  
Searcy, J.A., 1969, Flow-duration curves, U.S. Geol. Surv., Water Supply Paper 1542-A.

**Metric Conversion Factors**  
1 mile = 1.609 kilometres  
1 cubic foot per second = 0.02832 cubic metres per second

Compiled by J. D. Edie  
Cartography by H. De Souza  
Base map supplied by the Survey and Mapping Branch, Ministry of Natural Resources.